

## PATENT COOPERATION TREATY

## PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>3936 PCT</b>	<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416	
International application No. <b>PCT/SE2003/002021</b>	International filing date (day/month/year) <b>19.12.2003</b>	Priority date (day/month/year) <b>23.12.2002</b>
International Patent Classification (IPC) or national classification and IPC <b>E02F 9/28</b>		
Applicant <b>Combi Wear Parts AB et al</b>		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
  - a. ☒ (sent to the applicant and to the International Bureau) a total of 6 sheets, as follows:
    - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
    - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
  - b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) \_\_\_\_\_, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:
 

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand <b>30.06.2004</b>	Date of completion of this report <b>09.09.2004</b>
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Form PCT/IPEA/409 (cover sheet) (January 2004)

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## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))  
☐ publication of the international application (under Rule 12.4)  
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1 - 28 as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☒ the claims:

pages \_\_\_\_\_ as originally filed/furnished

pages\* 1 - 6 as amended (together with any statement) under Article 19

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☒ the drawings:

pages 1 - 16 as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages \_\_\_\_\_

☐ the claims, Nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (*specify*): \_\_\_\_\_

☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages \_\_\_\_\_

☐ the claims, Nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (*specify*): \_\_\_\_\_

☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims	<u>1-15</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-15</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-15</u>	YES
	Claims		NO

**2. Citations and explanations (Rule 70.7)****Documents cited in the International Search Report:**

D1: EP 1174547 A1  
D2: US 4324057 A  
D3: WO 9527102 A1  
D4: WO 9320293 A1

The cited documents represent the general state of the art.  
The invention defined in claims 1-15 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed wear parts system for detachable installation of wear parts in ground preparation machinery tools. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-15 is novel and is considered to involve an inventive step. The invention is industrially applicable.

PATENT CLAIMS

3.0 -06- 2004

PCT/SE 2003/002021

1. Wearing parts system (1) intended for the tool of  
a tilling machine of the type which comprises a holder  
part (3), attached to the tool and comprising a holder  
beak (8), and a wearing and/or replacement part (2),  
arranged at this holder beak (8) and comprising a  
hollow (7), which is designed to grip the holder beak  
(8) and is fixed thereto by means of a locking  
mechanism (5) through the holder part (3) and the  
wearing and/or replacement part (2), the holder beak  
(8) and the hollow (7) of the wearing and/or  
replacement part (2) having contact zones (9, 22, 23),  
each comprising at least two mutually interacting  
contact faces (10, 25, 26), certain of which only  
interact with one another after a certain predetermined  
wear, which contact faces are disposed one on the  
holder part (3) and one on the wearing and/or  
replacement part (2) and are intended to absorb forces  
 $F_x$ ,  $F_y$  and  $F_z$ , of which contact zones (9, 22, 23):

- at least one pair of the front contact zones (9a, 9b)  
is disposed on either side of the longitudinal line of  
symmetry Y of the wearing parts system (1), whilst at  
least one pair of the rear contact zones (9c, 9d) forms  
a certain defined angle with and on either side of the  
said line Y;

- at least one pair of the front and rear contact zones  
(9i, 9j and 9g, 9h) is disposed laterally offset in  
pairs and on either side of the line of symmetry Y;

- and contact zones which comprise, on the one hand, at  
least one front contact zone (9e) and, on the other  
hand, at least two rear contact zones (9, 22, 23), two  
of which are constituted by interacting joints (22, 23)  
with common rotational axis Z, which joints (22, 23)  
each comprise a recess (21) and a projection (19) each  
comprising a respective contact face (25, 26), disposed  
one on each coupling part (2, 3),

characterized in that the said recesses (21) comprise a respective end face (25) and in that the projections (19) comprise a respective end face (26), which faces

(25, 26) are designed to interact so as, on the one hand, to limit the pushing-on of the wearing and/or replacement part (2) over the holder part (3) and, on the other hand, to ensure that the contact between the contact faces (25, 26) will be made, primarily, at the common centre  $M_0$  of the said end faces (25, 26) and secondarily, as the wear has progressed, about this mid contact point  $M_0$  as an increasingly large contact zone (22', 23').

2. Wearing parts system (1) according to Claim 1, characterized in that the locking mechanism (5) comprises at least one locking device (27), placed through interacting openings (28A, 28B, 28C) through the holder part (3) and the wearing and/or replacement part (2), and that the locking device (27) and the openings (28A, 28B, 28C) in the wearing and/or replacement part (2) and the holder part (3) are divided into at least three different sections (29A, 29B, 29C and 28A, 28B, 28C) in the longitudinal direction of the openings (28A, 28B, 28C), in which the section (28A) of the locking device opening which appears first in the direction of fitting of the locking device (27) has the widest cross section (28A), whilst the third section (28C) of the locking device opening which appears last in the direction of fitting of the locking device (27) has the smallest cross-sectional section (28C) and the first introduced, third section (29C) of the locking device (27) has the smallest cross-sectional section (29C), whilst the second locking device section (29B) in the direction of fitting has a somewhat larger cross section (29B) than the first introduced, third section (29C) of the locking device (27), but, at the same time, somewhat

smaller than the section (28B) of the said second locking device opening, and in that the last introduced, first section (29A) of the locking device (27) has the widest cross section (29A) of the locking device (27).

3. Wearing parts system (1) according to Claim 2, characterized in that the locking device (27) is of the type which comprises a rigid locking device body (29) having an elastic material (32) inlaid into the locking device body (29), which material loads at least one movable engagement part (30, 31) toward a predetermined position.

4. Wearing parts system (1) according to any one of Claims 2 to 3, characterized in that the locking device (27) comprises at least two movable engagement parts (30, 31) loaded by elastic material (32), which engagement parts are constituted by a securing plate (31) for detachable blocking of the locking device (27) in a predetermined locking position, and a compression plate (30), which, via its elastic material (32), is designed to load the contact zones (9, 22, 23) of the wearing and/or replacement part (2) and of the holder part (3) one against the other.

5. Wearing parts system (1) according to any one of Claims 2 to 4, characterized in that the locking device (27) comprises a hollow (43) for the elastic material (32), which hollow (43) has a first gap opening (43) intended for the expansion of the elastic material (32) when this is subjected to load during the removal of the locking device (27), and, in addition thereto, one or more further gap openings (41, 42, 43) through which the particular engagement parts (30, 31), in a state which for the locking device (27) is free from external

loads, project a certain way beyond the body (29) of the locking device (27).

6. Wearing parts system (1) according to any one of the claims 2-5, characterized in that the locking device opening (28B) through the beak (8) of the holder part (3) comprises a first portion (35, 37) in the direction of fitting which is at least wider in a first direction than a corresponding portion (29B') of the body (29) of the fitted locking device (27), which portion (35, 37) of the locking device opening (28B) comprises a first segment (35) and a second segment (37), which first segment (35), which is wider than the corresponding locking device body (29) in the said first direction, is designed to constitute a cavity (35) intended for the securing plate (31) in its extended position blocking the locking device (27), whilst the second segment (37) is designed to constitute, or form, a space (40) intended for the expansion of the elastically deformable resilient material (32) when this is subjected to load during the removal of the locking device (27).

7. Wearing parts system (1) according to any one of the claims 2-6, characterized in that connecting to the locking device opening (28A) through the hood (6) of the tine part (2) there is a pin (45) disposed on the inner side of the roof (36) of the hood (6), against which pin (45) the securing plate (31) of the locking device (27) shall fix.

8. Wearing parts system (1) according to Claim 7, characterized in that a bevel (46), which widens downward in the direction of fitting of the locking device (27), is disposed on that side of the locking device body (29) facing toward the said pin (45), so

that the locking device body (29) and the pin (45) are free from contact with each other.

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9. Wearing parts system (1) according to any one of the claims 2-8, characterized in that a cross section through the body (29) of the fitted locking device (27) level with the inner side of the roof (36) of the hood (6) consists of a homogeneous, solid, unbroken cross section or a cross section which is unbroken to the extent of at least 50% or more.
10. Wearing parts system (1) according to any one of the preceding claims, characterized in that a leverage ratio from the Y-line of symmetry to the contact point  $M_0$  between the hood (6) of the tine part (2) and the holder part (3) is equal to zero or less than the radius  $R_2$  of the projection (19).
11. Wearing parts system (1) according to any one of the preceding claims, characterized in that the distance between the end faces (25, 26) of the collateral joints (22, 23) at their common centre  $M_0$  is equal to zero or substantially less than between collar end faces (17, 18) of the wearing and/or replacement part (2) and the holder part (3).
12. Wearing parts system (1) according to either of Claims 10-11, characterized in that the radius  $R_1$  for a respective recess (21) is larger than the radius  $R_2$  for a corresponding projection (19).
13. Wearing parts system (1) according to any one of the claims 2-12, characterized in that at least two rear contact zones (9) are provided, which comprise a greater angle of inclination to the Y-line of symmetry of an inner, longitudinal peripheral line  $P_1$  along the locking device opening (28B) through the beak (8) than



of an outer, collateral longitudinal peripheral line  
P<sub>ii</sub>.

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14. Wearing parts system (1) according to any one of  
5 the preceding claims, characterized in that the various  
contact faces (10, 11, 25, 26) comprise a plurality of  
different inclinations, conicities and roundings,  
several being parallel but laterally offset.
- 10 15. Wearing parts system (1) according to any one of  
the preceding claims, characterized in that torque  
loads caused by the rotation of the wearing and/or  
replacement part (2) in relation to the holder part (3)  
are designed to be absorbed directly or after a certain  
15 minor wear by at least one of the front contact zones  
(9) in interaction with at least the said contact zones  
(25, 26) on the rear collateral joints (22, 23).